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STATISTICAL BULLETIN
METROPOLITAN LIFE INSURANCE COMPANY

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Some Current Results in Pneumonia Treatment

OUTSTANDING among the medical advances of the past decade is the great reduction in the death rate from pneumonia. The record for 1941 is particularly striking, because the rate has continued to fall this year despite the occurrence of a widespread epidemic of influenza in the early months of the year. Indeed, the winter of 1940-1941 marks the first time on record that the mortality from pneumonia has materially declined when epidemic influenza was prevalent.

Despite this remarkable progress, pneumonia remains an important cause of death, much of which is certainly preventable. To obtain some information on the reasons for failure in these preventable deaths was the chief purpose of an inquiry conducted by the Statistical Bureau of the Metropolitan Life Insurance Company during the early months of the year, among physicians certifying deaths from pneumonia for policyholders of the Company. A questionnaire was addressed to the physicians to elicit information regarding the time elapsed between the onset of illness and the summoning of medical aid, as well as regarding the essential details of diagnosis, bacteriology, therapy, and complications of each case. The period covered was roughly from mid-December to mid-April. Since the answering of these questionnaires was purely voluntary, there may be a certain bias in the returns, but on the whole they are believed to give a fair picture, for the urban population of the country, of those aspects of the pneumonia situation with which the recent inquiry was concerned.

Information, more or less complete, was received on 2,334 deaths, of which about 80 percent were among Industrial policyholders. According to the information originally filed with the claim papers, 1,589 were primarily chargeable to pneumonia, 358 to influenza, and 387 to other causes with pneumonia as contributing cause. Among the primary pneumonias, 58 percent were lobar, but among the secondary pneumonias only 30 percent were lobar.

The first notable feature of this

experience is the age distribution of the deaths. Considering only the primary pneumonias, the fatal cases are now concentrated in young children and in comparatively old people. About one eighth of the total were less than 5 years of age, only 17 percent were between 5 and 45, and the remaining 70 percent were 45 or older. Those 65 years of age or more constituted 37 percent of the deaths. High death rates in infancy and in middle and old age have always characterized pneumonia mortality, but this characteristic is now more striking than ever, particularly in old age where the prognosis of pneumonia is least favorable under any method of treatment.

Delay in calling the doctor was frequent in these fatal cases. In only about one tenth of the cases was the doctor called on the first day of illness. In more than 40 percent a doctor had not been called until the fourth day or later, and in 12 percent not until the eighth day or later. Delay was more common among colored patients than among the white, particularly among those suffering from lobar pneumonia. In general no important age differences as regards the delay were found, except for a somewhat greater frequency of serious delay in older persons.

Bacteriological investigation in pneumonia has become comparatively infrequent if the fatal cases are typical of the current situation in the community at large. In approximately two thirds of the primary lobar pneumonias and four fifths of the bronchopneumonias, no attempt was made to determine the organism involved, and even in one fourth of the cases reported to be pneumococcal pneumonia apparently no attempt was made to type the pneumococcus. Incidentally, of the 464 cases with bacteriological study, 72.4 percent were pneumococcal (a few with other organisms also), 5.6 percent streptococcal, 2.2 percent staphylococcal, and the rest not actually identified, although known not to be pneumococcal. It is clear then that despite the advice of some experts in the field that cases should continue to be typed, this practice is not uniformly followed today, largely because of the reliance of most physicians on chemotherapy.*

The inquiry clearly indicated the prime position which chemotherapy holds in the treatment of pneumonia today. Of the policyholders dying from lobar pneumonia, 84.3 percent had received chemotherapy —72.8 percent without serum and only 11.5 percent with serum. Less than 1 percent had been treated with serum only. The proportion treated by chemotherapy reached a peak of 87.2 percent at ages 55 to 74, and was only slightly less—85.5 percent—between the ages 25 and 54. In the latter age group, the proportion treated with both serum and chemotherapy combined was

*That is, the administration of a chemically prepared substance (as distinguished from a biological product or serum) which is designed to attack specifically the invading organism or virus, with a minimum toxic action upon the patient.

highest, namely, 16.4 percent. The lowest proportion with chemotherapy was recorded at ages under 5 and over 75; but even at these age periods it was approximately 75 percent. Among the policyholders dying from bronchopneumonia, the proportion receiving chemotherapy was 64.4 percent, and in only 2.0 percent was this treatment combined with serum. The proportion receiving chemotherapy in bronchopneumonia was greatest — 75 percent — at the younger ages, under 5, and lowest—54.2 percent—at ages over 75.

Sulfathiazole was the most popular sulfonamide drug used in pneumonia treatment during the past winter. Among cases in which only one of these drugs was used, approximately twice as many were treated with sulfathiazole as with sulfapyridine. In only 7 percent of the cases were other drugs of the sulfa family used exclusively. In 11 percent of the total treated with these drugs a combination of them was used. It may be noted in passing that only four cases in the series were treated with sulfadiazine, which was under successful trial last winter in a few medical centers. This drug is likely to be used far more widely this winter.

Analysis of the reasons for discontinuing chemotherapy in these fatal cases is enlightening. In the majority of cases — 58 percent — therapy had been continued until shortly before death. The effectiveness of this form of therapy seems reflected in the fact that in 11 percent of the deaths chargeable to lobar pneumonia, drug administration was discontinued because the patient showed full clinical recovery from the disease. These patients died subsequently of complications or of a relapse. This was true also in 6 percent of the deaths from bronchopneumonia. Many of the patients were reported to have shown some degree of improvement in their pneumonia, although they later succumbed to it or its sequelae because of their poor general condition or intercurrent disease. The chief other reasons stated for discontinuing the drug were nausea or vomiting (4 percent), cyanosis, renal, and blood complications (each 1 percent), inability to administer the drug orally (3 percent), and failure to show improvement (6 percent).

Another remarkable feature of this group is the high frequency of diseases complicating pneumonia. The noteworthy concentration of these deaths in infancy, early childhood, and old age has already been mentioned. In infancy many of these fatalities were associated with prematurity, congenital defects or weakness, malnutrition, mental deficiency, or intercurrent or preceding infections of a serious nature. At the older ages a majority had previously been suffering from chronic arteriosclerotic or hypertensive diseases of the heart, brain, or kidneys, and from chronic respiratory conditions, such as bronchitis, bronchiectasis, and asthma. Even in early adult and middle life complicating diseases were frequent.

Indeed, it was the physicians' judgment in approximately one fourth of these fatal cases charged to pneumonia that death was due primarily to the complicating disease.

From this review it is clear that in urban areas pneumonia is being treated by modern therapy. Too often, however, the efforts of the physician are futile, because delay in calling him has put the patient beyond help. This indicates that there should be no letup in health propaganda urging prompt medical and nursing care of patients suffering from acute respiratory symptoms. Whether for good or for ill, this study indicates the partial and at least temporary abandonment of bacteriological investigation of cases in general practice. Unless there is general agreement by the experts that such omission is ill-advised and a serious effort is made to convince physicians of the prime value of the procedure, it will largely cease to be carried out routinely.

Finally, the results of this study suggest that we are approaching a minimum figure below which it is unlikely that pneumonia can be reduced greatly. Prediction as to what this minimum will be is premature. Already, in 1940, rates below 10 per 100,000 from pneumonia among white Industrial policyholders of the Metropolitan Life Insurance Company have been recorded at ages 5 to 34 years, and among women at ages 35 to 44 the rate was only slightly above 10. It is at these ages that the reduction in the death rate from pneumonia has been relatively greatest—approximately two thirds within 10 years. The greater part of this gain was achieved between 1937 and 1940. While large reductions have been recorded even at later ages, the high proportion of deaths from pneumonia among older persons with serious chronic diseases indicates that such complicated cases are frequent and are so often likely to terminate fatally, irrespective of the type of treatment, that they will eventually be the important factor in determining the ultimate level of mortality from pneumonia.

The splendid progress made thus far in controlling pneumonia, gratifying as it is, does not permit any relaxation in our efforts against the disease. These must be unremitting if present gains are to be maintained and extended. Too many pneumonia deaths still occur in the train of colds and upper respiratory infections which prompt and adequate care could have prevented from developing into pneumonia. Even in older people with chronic disease, the case-fatality in pneumonia is higher than it need be. Increased efforts also need to be exerted in the direction of prevention of predisposing minor infections. Many persons needlessly suffer attacks which they might be saved by avoidance of exposure or by greater attention to personal hygiene. Through concerted efforts in all these directions further reduction in pneumonia mortality is attainable and worth fighting for.

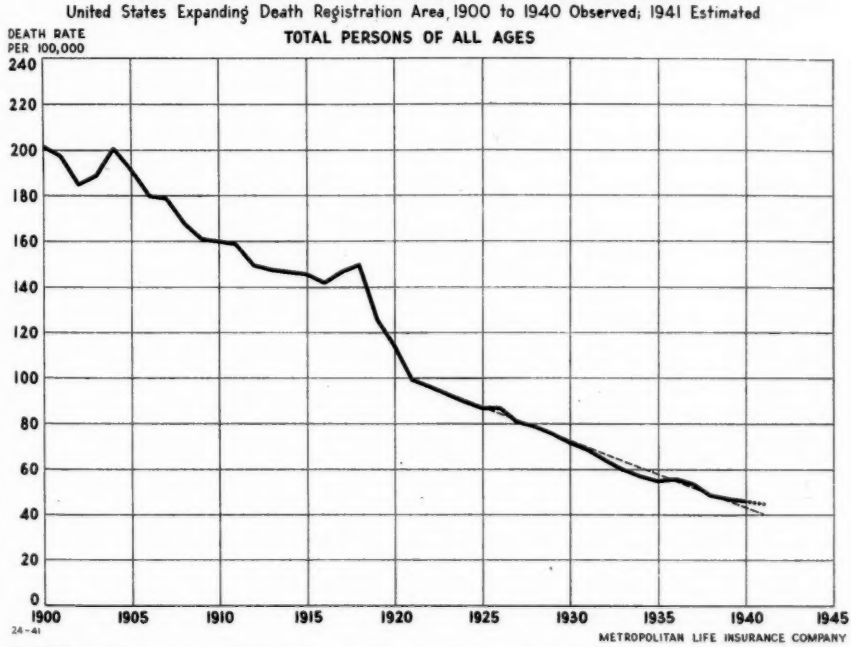
Is the Decline in Tuberculosis Slowing Down?

CURRENT indications are that when the final reports for 1941 are in, the death rate from tuberculosis for the United States will be somewhat less than 45 per 100,000 total population. This will mark still another year of record low mortality from this disease. The improvement will be more than 2 percent over 1940, when, according to provisional reports, the death rate was 45.7 per 100,000. But a single year's record must be weighed only in association with the trend of several years, and when we carry our comparisons back further, it is found that even as recently as 1924 the death rate from tuberculosis was practically twice that of today; if we go back to 1900, we find that the mortality then was 4½ times the present. The figure on this page provides a long-term perspective of tuberculosis mortality in the United States since 1900.

The period since 1921 is of special interest, being characterized by a very steady decline.* During the last two decades—that is, since 1921—the death rate from tuberculosis decreased, on an average, by three per 100,000 each year, notwithstanding the two very slight increases noted for 1926 and 1936.

DEATH RATES FROM TUBERCULOSIS - ALL FORMS

United States Expanding Death Registration Area, 1900 to 1940 Observed; 1941 Estimated



*The earlier years, since 1900, data for which are included in the graph, have been discussed in detail in *Twenty-Five Years of Health Progress*, 1937, pages 79 *et seq.*

As a matter of fact, the observed points up through 1931 lie practically on a straight line. But beginning with 1932, and continuing through 1935, there was a dip in the death rates from the straight line followed previously. This marked improvement gave an added ray of hope to the prevailing optimism regarding the future trend of tuberculosis mortality. The extraordinarily low rates for these few years from 1932 to 1935 were somewhat unexpected and, since they came at a time when our economic depression was at its worst and unemployment was widespread, were all the more welcome.

Beginning with 1936, however, a new course of events in tuberculosis mortality appears to have set in. The year 1936 witnessed, for the first time in a decade, an increase in the death rate from tuberculosis, which, though small, nevertheless carried the point for the year above the trend line for the period under survey. Though this setback was relatively slight and immediately gave way to a series of decreasing death rates, it is important to note that at no time since then has the death rate fallen below the trend line established by the years from 1921 to 1940. Indeed, the points from 1938 onward follow a course distinctly different from the trend line. This situation raises an interesting question which carries us back to the events immediately prior to 1936.

Many observers saw, in the low death rates from tuberculosis during the depression years from 1932 to 1935, the rewards of intensive public health effort in previous years. Following the same train of thought, some opinions were expressed, during the depression years, that the conditions of large-scale unemployment and resulting privation then prevailing would in time be reflected in higher death rates from tuberculosis. Fortunately, as we have seen, only 1936 experienced a setback, and the downward trend in tuberculosis mortality was then resumed. However, the average annual decline in the death rate from 1936 to 1941 is a little over two per 100,000, whereas that for the period from 1921 to 1940 was about three per 100,000.

Quite recently another factor has entered which may cause a slackening in the decline of tuberculosis unless precautionary steps are soon taken. We have already shown, in these pages, the adverse effect of war on this disease.* Unless appropriate measures are made effective immediately, the added strain of labor in defense industries and the inadequacies of housing for defense workers will undoubtedly leave their mark on our record of tuberculosis mortality. It should be obvious that, in the face of these conditions, there must be no pause in our campaign against tuberculosis, notwithstanding the concentration of our energies on National defense.

We can hardly expect the rate of improvement in mortality from tuberculosis experienced during the

*"War and Tuberculosis," STATISTICAL BULLETIN, August 1941.

last two decades to continue indefinitely, for then the death rate would meet the zero line before 1955—obviously a conclusion beyond practical possibilities. As the death rate is brought to lower levels, further gains will become more and more difficult, so that some slackening in the rate of improvement appears inevitable. However, when we examine the situation in regard to tuberculosis in our country and consider the extended and excellent facilities which have been developed here, it is difficult to believe that the time is at hand for any serious reduction in the rate of improvement. On the contrary, we still see the situation optimistically, and our hopes for ultimate eradication of this plague are as bright as ever. For we have faith in the effectiveness of our medical investigators, in our public health authorities, and in the good sense of our people who will not stop short in their efforts.

In 1940 twelve of the States of the Union already had death rates from tuberculosis below 30 per 100,000, and six of them—Nebraska, Utah, Idaho, Iowa, Wyoming, and North Dakota—had death rates of 20 per 100,000 or less.* All of the 12 States, with the exception of Maine and New Hampshire, are either in the Midwest or Far West. Nine additional States had death rates ranging from 30 to 40 per 100,000, and all of these were in the northern tier of the country. On the other hand, we find six States—all except Nevada in the southern tier of our country—with death rates from tuberculosis of 60 or more. Practically all of the States in this group are currently experiencing death rates from tuberculosis on a level with that prevailing in the country as a whole a decade or more ago. There were eight States with death rates from 50 to 60 per 100,000, and of these only California and Colorado were outside the Southern area.

With tuberculosis at such a relatively high level in a large area of the United States, it should be clear that there is at the present time no warrant for any slackening in the rate of decline of the general death rate from this disease for the country as a whole. Substantial improvement is possible by the few States which are now experiencing death rates three or more times as great as those of the most favored States. Evidently our special efforts in the campaign against tuberculosis should be concentrated in the areas lagging behind the rest of the country. If we so direct our efforts, the recent slackening in the downward trend in the death rate from this disease can be made to appear as only a temporary phase in the movement toward its practical elimination as an important factor in our mortality picture.

* The death rates for 1940 were derived from United States Public Health Reports, May 23, 1941, and preliminary releases of State data.

Statistical Information, Please

What is the age at which a person may expect, according to averages, to live just as long again?

At age 35 the expectation of life is itself 35 years, so that a white person at age 35 may expect, according to averages, to live to age 70, which happens to be the oft-quoted biblical "three score years and ten." No doubt it is this figure that Dante had in mind in the opening lines of his Divine Comedy, where he refers to himself as being halfway on the road of life. Writing this, supposedly, in 1300, he was then 35 years old.

This halfway station, when a man's expectation of life is equal to his age, is somewhat variable according to changes in mortality, but much less so than the average length of life. According to mortality in the United States, the former figure has varied only from about 33 to the present 35—that is, by two years—in the last four decades, during which the average length of life has increased by almost 15 years.

Has the number of annual births in the United States passed its peak?

Probably. It is estimated that in 1921 there were more than 2,600,000 births in the United States. This was the year in which the postwar boom in the birth rate occurred. After that there was an almost continuous decline to the year 1933, when the number of births was 2,081,232, the lowest figure since the peak year, 1921. After that, the number moved somewhat irregularly up and down with, on the whole, an upward tendency, leading to the 1940 figure of 2,353,988, the highest since 1928. It remains to be seen whether the upward movement will continue to a new all-time high. This would require an increase of about one quarter of a million over last year's figure to match the number of births estimated for 1921.

Has the annual number of deaths in the United States passed its peak?

We have every reason to hope that for many years to come the excessively high figure for 1918 will not be reached again. In that influenza year the total number of deaths was nearly 1,875,000. In recent years the figure has been of the order of 1,400,000, the year 1940 being slightly in excess of 1939 and 1938. The lowest total of annual deaths since 1918 was experienced in 1921, namely 1,250,000—incidentally, in the same year that saw our all-time highest total of annual births. The growth of our population, with an increasing proportion of older persons, will in all probability eventually cause a rise in the total annual deaths beyond the figure for 1918, in spite of our greatly improved health conditions.

What is the age at which the greatest number of deaths occur?

In the United States, as constituted today, more persons die at age 71 than at any other age, except in the first year of life. In 1939—the latest year for which we have data available—there were 108,846 deaths of infants under 1 year of age and about 30,000 deaths of persons at age 71.

Health Record for the First Nine Months of 1941

IT APPEARS now, at the end of the third quarter of the year, that 1941 will rank among the very best health years. Our favorable prognostication is based on the experience of the millions of wage-earners and their dependents who are Industrial policyholders of the Metropolitan Life Insurance Company, and from fragmentary data for the general population.

The 1941 death rate of the Industrial policyholders of the Metropolitan Life Insurance Company for the January-September period is 7.6 per 1,000, or 1.3 percent below the 7.7 per 1,000 recorded at this time last year, which itself was an excellent year. For the general population, in the 88 major cities of the United States, there have been 1,097 fewer deaths reported in the first 40 weeks of 1941 than in the corresponding period of 1940, a decline of about 1 percent in rate. For New York City the 1941 year-to-date rate is 9.9 per 1,000, or 2.9 percent below the figure recorded in the same period last year—namely, 10.2.

One outstanding feature of the year's experience has been the marked improvement in mortality as the year has advanced. While the early months of 1941, owing to the widespread epidemic of influenza, registered higher rates than the corresponding months of 1940, the latest month, September, recorded a rate of 6.5, which is the lowest rate for any month in any year in the history of the Company's Industrial policyholders.

New low records have been established for no less than eight diseases and conditions for this period of the year. The list includes scarlet fever, diphtheria, pneumonia, tuberculosis, appendicitis, diseases of the puerperal state, suicides, and homicides. In at least four of these—pneumonia, tuberculosis, appendicitis, and suicides—it appears almost certain that the rates for the year will be minimal.

For the first time in several years the death rate for the four principal communicable diseases of childhood, considered together, has shown an increase. This is due largely to the rise in mortality from measles, since the remaining three diseases have shown little change. Scarlet fever and diphtheria dropped slightly to new low rates, while whooping cough increased to a figure fractionally above that of last year. Another important childhood disease—diarrhea and enteritis—whose record has improved in recent years, is also up fractionally in 1941, owing to the increase in rate among Canadian babies. Despite these slight setbacks, the mortality from the communicable diseases of childhood and from diarrhea and enteritis, is only one fourth that of 10 years ago.

The pneumonia record is outstanding this year among those of the important causes of death. The current rate has reached the remark-

ably low level of 33.2 deaths per 100,000, or less than one half that of as recent a year as 1937. The continued decline in pneumonia deaths, despite the influenza epidemic earlier in the year, seems to establish firmly the value of chemotherapy in the treatment of this disease.

Tuberculosis, another important respiratory condition, has also recorded a new low death rate this year. The decline continues a trend which has been uninterrupted among the Company's Industrial policyholders since 1926. It is encouraging to note that the decrease in rate amounts to as much as 2.7 percent for the single year, since the 1940 rate had shown some tendency to level off.

That the cardiovascular-renal diseases as a group should show slightly lower mortality than in 1940 is particularly noteworthy, since we have come to expect an increase in the deaths from these so-called "degenerative conditions" each year. Of the four diseases included in this classification, only one—diseases of the coronary arteries and angina pectoris — increased; two —"other diseases of the heart" and chronic nephritis—declined; while cerebral hemorrhage remained at the same level as last year.

The usual rise in cancer mortality is in evidence, although the amount of increase is small, namely, only 1.9 percent for the first nine months of 1941 over 1940. The death rate for diabetes decreased 4.5 percent.

The death rate for the diseases of the puerperal state, based on total persons, has failed to show as large a decline as in recent years. This does not necessarily reflect an unfavorable development in maternal mortality, however, since undoubtedly there has been an increase this year in the number of women exposed to the hazards of pregnancy and childbirth. While exact figures are not available on the rise in birth rate for this group, it appears from the general population data that it has been appreciable. Provisional figures indicate that the birth rate in the first six months of 1941 for 43 reporting States and the District of Columbia was 18.2 births per 1,000 population, compared with a provisional rate of 17.3 for the corresponding period in 1940.

One feature of the nine months' mortality record which has remained consistently poor is the high accident death rate. No doubt the increased industrial activity in connection with the program of National defense has contributed to the rise in industrial accidents. Likewise, the same factor probably has affected the rate for motor vehicle accidents. Month by month the motor vehicle accident rate of 1941 has exceeded that of 1940, the excess being as high as 42.3 percent in March. Although the excess has not been as great as this in recent months, the year-to-date rate is still 20.2 percent above that of a year ago. It now appears likely that the number of lives lost from motor vehicle accidents in the United States may reach a new all-time high in 1941, passing the 40,000 mark.

The following table shows the mortality among Industrial policyholders for September 1941, August 1941, and September 1940, together with the death rates for the first nine months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Death Rates per 100,000 Policyholders from Selected Causes. Industrial Department. Weekly Premium-Paying Business*

Causes of Death	Annual Rate per 100,000 Policyholders*				
	September 1941	August 1941	September 1940	Year to Date: End of September	
				1941	1940
All Causes—Total	652.7	696.3	680.8	760.8	771.2
Typhoid fever	0.1	0.4	1.1	0.4	0.6
Measles	.1	.3	—	1.0	.4
Scarlet fever	.2	—	.2	.5	.6
Whooping cough	1.1	1.1	1.2	1.3	1.2
Diphtheria	.8	.6	.6	.6	.8
Influenza	1.4	1.9	2.1	9.1	8.6
Pneumonia (all forms)	16.8	17.9	17.9	33.2	38.0
Tuberculosis (all forms)	38.5	43.4	39.9	43.9	45.1
Tuberculosis of respiratory system	35.5	39.3	35.8	40.1	40.7
Syphilis	10.3	9.6	9.0	11.4	11.6
Cancer (all forms)	98.8	102.5	100.7	104.2	102.3
Diabetes mellitus	20.8	23.7	24.2	27.9	29.2
Cerebral hemorrhage	53.7	54.9	53.1	61.4	61.3
Diseases of the coronary arteries and angina pectoris	44.2	49.6	45.9	54.1	51.9
Other chronic heart diseases†	125.5	131.7	134.3	157.7	160.2
Diarrhea and enteritis	8.2	10.2	6.2	4.4	4.3
Appendicitis	7.1	7.8	9.2	7.7	9.3
Chronic nephritis	40.1	43.7	47.5	52.1	56.9
Puerperal state—total	4.5	5.2	4.5	4.7	4.8
Suicides	6.6	5.1	8.1	7.3	8.3
Homicides	3.4	3.7	4.1	3.6	3.7
Accidents—total	51.8	61.2	49.6	50.9	46.4
Home accidents	7.5	9.6	8.1	11.1	11.7
Motor vehicle accidents	22.1	21.5	20.3	20.2	16.8
All other causes of death	118.8	122.1	121.2	123.3	125.6

*The rates for 1941 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

†International List (1940) titles 92, 93 (c), (d), (e), and 95.

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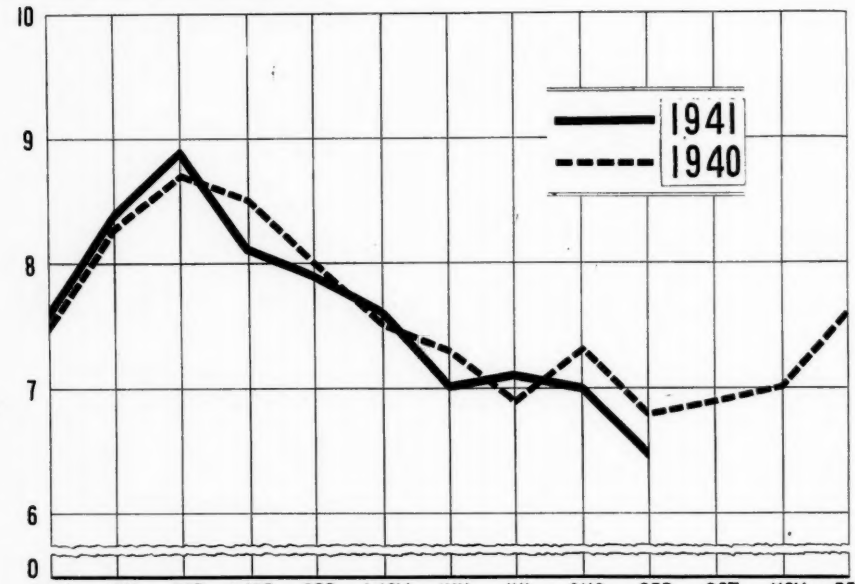
MORTALITY FROM ALL CAUSES

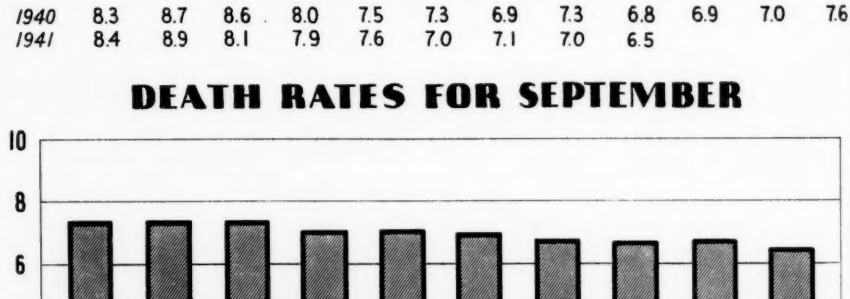
METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT, WEEKLY PREMIUM-PAYING BUSINESS

DEATH RATES PER 1,000 · ANNUAL BASIS



(DEC)	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1940	8.3	8.7	8.6	8.0	7.5	7.3	6.9	7.3	6.8	6.9	7.0	7.6
1941	8.4	8.9	8.1	7.9	7.6	7.0	7.1	7.0	6.5			

DEATH RATES FOR SEPTEMBER



Rates for 1941 are provisional.

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